

PROCEEDINGS

of the

American Society

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Civil Engineers

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PROCEEDINGS

SOCIETY AFFAIRS

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AMERICAN SOCIETY OF CIVIL ENGINEERS

PROCEEDINGS

VOL. LIII JANUARY, 1926

No. 1

SOCIETY AFFAIRS

1926 Annual Meeting

The American Society of Civil Engineers will hold its Seventy-third Annual Meeting beginning January 20, 1926. The general arrangement of these sessions, so popular in the past years, will be followed; this will comprise general business and Honorary Awards on Wednesday morning, reports of Society Committees on Wednesday afternoon, meetings of the Technical Divisions throughout Thursday, and an all-day excursion on Friday.

Besides the award of Society prizes and medals, the Wednesday morning session will be dignified with the conferring of two Honorary Memberships, namely, to William Barclay Parsons, M. Am. Soc. C. E., and to Arthur N. Talbot, Past-President, Am. Soc. C. E. Following the report of the Tellers, luncheon will be enjoyed on the Fifth Floor of the Engineering Societies Building. It is expected that the reports from sixteen Special Committees regarding the progress of the technical work in their charge will occupy all of Wednesday afternoon.

Likewise, the full day on Thursday will be utilized for engineering discussion, with programs sponsored by seven Technical Divisions. A wide variety of topics will be offered: the Structural Division will consider the Florianopolis Bridge in Brazil and Forest Utilization; in the Highway Division the subjects concern Highway Location, Bituminous Treatment of Forest Roads, Moisture in Subgrades, and Concrete Pavements; the City Planning Division expects to consider the questions of Community Development and City Planning at Cincinnati; the general topic of the Sanitary Engineering Division will be Garbage Disposal; three specific projects are on the program of the Power Division, namely, the Kearny, N. J., Power Station, the Hell Gate Power Station of New York City, and the Soft Maple Dam in Northern New York; the recently organized Waterways Division will discuss the Deeper Hudson and the New York Barge Canal, besides taking an excursion around New York Harbor in the afternoon; and, finally, the Construction Division

will meet for organization and listen to papers on Winter Construction and Subway Construction Work in New York.

The social sessions will start with the luncheon on Wednesday. That same evening, the Annual Dinner Dance and Reception will be held as usual at the Hotel Pennsylvania with the customary elaborate arrangements. The Annual Smoker is scheduled for Thursday evening, January 21, preceded by a special program in the Auditorium of the Engineering Societies Building. Finally, the whole of Friday will be given over to an excursion in the vicinity of New York, starting by boat from the Battery and proceeding to inspect the new and large bridge of the Central Railroad of New Jersey, near Elizabethport, N. J., and thence to the Vehicular Tunnel under the Hudson River—the Holland Tunnel—where luncheon will be served and a detailed inspection made.

Extensive preparations have been made to entertain the visiting ladies. These include provisions for attending a matinee on Wednesday, a sightseeing trip around New York City on Thursday afternoon, followed by tea at the Hotel Plaza, and a theatre party in the evening.

No special plans are made for Friday evening. This will be given over to a number of engineering alumni dinners and meetings.

Complete details of the Annual Meeting will shortly reach the members in the form of the official program. The details here given will enable members to formulate their plans in advance more fully; but no program or announcement can do justice to the worth of the technical sessions so carefully planned, and the inspiration and joy of contact with old friends.

New Honorary Members

By action of the Board of Direction the names of two new Honorary Members have recently been added to the rolls. The ceremony of bestowing this, the highest grade of membership, will take place at the time of the Annual Meeting, Wednesday morning, January 20, 1926. For the information of members, short biographical sketches of the two men are appended.

WILLIAM BARCLAY PARSONS

William Barclay Parsons, M. Am. Soc. C. E. (Director, 1896-98), was born in New York, N. Y., on April 15, 1859. He was graduated from Columbia College in 1879, with the degree of Bachelor of Arts, and from the School of Mines, Columbia University, in 1882, with the degree of Civil Engineer.

Having obtained some practical experience during his vacations, he entered the Maintenance of Way Department of the Erie Railroad Company. In 1886, he began private practice in New York, N. Y., and was engaged chiefly in making plans for underground railways. In 1891, the State created a Rapid Transit Commission and Mr. Parsons was appointed Principal Assistant Engineer, and, on the re-organization in 1894, he became Chief Engineer. The work was suspended in 1898 for lack of municipal funds. After service as Chief of Engineers, N. G. S. N. Y., during the Spanish War, he went to China to make railway surveys.

In 1900 the contract for the first section of the New York Subway was let; this, together with the second section from the City Hall to Atlantic Avenue, Brooklyn, N. Y., was built under his direction and in accordance with his plans. On the opening of the Subway in 1904, he resumed private practice.

Mr. Parsons has been a member of the Isthmian Canal Commission; a member of the Board of Advisory Engineers of that Commission; jointly, with the late Sir Benjamin Baker, Hon. M. Am. Soc. C. E., and Sir John Wolfe Barry, a member of a Board of Advisory Engineers to the Royal Commission, London Traffic; Chief Engineer of the Cape Cod Canal; Chairman of the Chicago Transit Commission; Special Consulting Engineer of the Massachusetts Railroad Commission; Consulting Engineer for several cities; and has been connected with many railways, hydro-electric, water supply, and other engineering works. Mr. Parsons has been a Director of various corporations; is Chairman of the Board of Trustees, Columbia University; Trustee of the New York Public Library and of Carnegie Institution; and was a member of the Commission appointed to revise the Charter of the City of New York. He has received the Honorary Degrees of Doctor of Laws, Doctor of Science, and Doctor of Engineering from various universities.

During the World War he served as Major, Lieutenant Colonel, and Colonel of the 11th Engineers and after the war was promoted to be Deputy Chief Engineer of the Reserve Corps with the rank of Brigadier-General, and is now retired with that rank. He received from the United States Government the Distinguished Service Medal, the Victory Medal with five clasps, and a Citation for Specially Meritorious Service; from the State of New York the Conspicuous Service Cross; from Great Britain, the Distinguished Service Order; and from Belgium, the Order of the Crown. France has made him an Officer of the Legion of Honor.

He has written many scientific papers, addresses, magazine articles, and the following books: "Turnouts"; "Track"; "Rapid Transit in Foreign Cities"; "An American Engineer in China"; "Robert Fulton and the Submarine"; and "The American Engineers in France."

Mr. Parsons is a Member of the Institution of Civil Engineers, the American Institute of Consulting Engineers, Société des Ingénieurs Civils de France, Academy of Arts and Sciences, Honorary Member of the American Institute of Architects, etc. The Society has awarded him the Norman Medal and the Institution of Civil Engineers the Telford Medal.

ARTHUR NEWELL TALBOT

Arthur Newell Talbot, Past-President Am. Soc. C. E. (Director, 1909-10; Vice-President, 1911; President, 1918), was born at Cortland, Ill., on October 21, 1857. In 1881 he was graduated from the University of Illinois with the degree of Bachelor of Science in Civil Engineering. The next four years were spent on railroad location, construction, and maintenance in Colorado, New Mexico, and Kansas, on the Denver and Rio Grande Railroad and the Atchison, Topeka, and Santa Fe Railroad. His later engineering work during summers and at other times included bridge construction in Minnesota and Idaho for the Northern Pacific Railroad Company, the design and construction of

various minor water-works and filtration plants, sewerage systems and sewage treatment plants, and other municipal works, together with consultation work on larger and more important projects.

The work of the engineering teacher has been his principal life work. In 1885, Mr. Talbot was appointed Assistant Professor of Engineering and Mathematics in the University of Illinois, and, in 1890, Professor of Municipal and Sanitary Engineering and in charge of Theoretical and Applied Mechanics, a position he still holds. Through this period of the University's expansion he has taught a variety of subjects and has interested himself in many lines of engineering. During this time also he has been largely responsible for the establishment, organization, and development of well-equipped laboratories in materials testing and hydraulics.

Throughout his career Professor Talbot has been interested in engineering research. He aided in the formation of the Engineering Experiment Station of the University of Illinois and through twenty years has contributed to its methods and standards as well as to its investigations and publications. Even before the formation of the Station, he carried on a variety of experimental work. He has conducted investigations in hydraulics and water and sewage treatment, and on the properties of steel, brick, tile, and concrete, and of structural members made with such materials. In the period since 1904 many investigations have been made on reinforced concrete beams, columns, pipes, footings, frames, and other structural members, and on reinforced concrete buildings. Since 1914 he has been in charge of the research work of the Joint Committee on Stresses in Railroad Track of the American Society of Civil Engineers and the American Railway Engineering Association, conducting extensive tests on track under the loads of locomotives and cars.

His writings include more than two hundred and fifty articles and discussions on engineering topics. The formula given in the paper on "The Determination of Waterways for Bridges and Culverts", published in 1887, has been widely used by railroads, as has the method of spiraling curves developed in his book, "The Railway Transition Spiral." Twenty-two *Bulletins* of the Engineering Experiment Station record the results of research in concrete and reinforced concrete, timber, steel, and hydraulics. Four Progress Reports of the Special Committee on Stresses in Railroad Track describe and discuss the results of elaborate experimental work.

The University of Pennsylvania conferred on him the Honorary Degree of Doctor of Science in 1915 and the University of Michigan that of Doctor of Engineering in 1916. In 1924, the Western Society of Engineers awarded him the Washington Award "for his life work as student and teacher, investigator and writer, and for his enduring contribution to the science of engineering."

Among the engineering and scientific societies in which Professor Talbot holds membership are the Institution of Civil Engineers (London), American Society of Mechanical Engineers, Western Society of Engineers, Illinois Society of Engineers, American Railway Engineering Association, American Concrete Institute, American Waterworks Association, New England Water Works Association, American Public Health Association, and American

Association for the Advancement of Science. He is an Honorary Member of the Institute of Structural Engineers (London). He is a Charter Member and Past-President of the Society for the Promotion of Engineering Education. He has been connected with the American Society for Testing Materials since its organization in 1898, has been active in its work and management, and is a Past-President and Honorary Member of the Society. His clubs include the Chicago Engineers Club and the University Club of Chicago.

Why No Collingwood Prize?

The Collingwood Prize for the current year has not been awarded for the simple reason that there was no one eligible to receive it. If this were a rare occurrence it would be no occasion for comment, but the fact is that the failure to award has become almost the rule instead of the exception. This prompts the inquiry as to whether the regulations for the award or the attitude of those who might benefit by it are at fault. In common with the other annual awards of the Society, the Collingwood Prize is given for a meritorious paper printed in *Transactions*; it is differentiated from the others, however, by the necessity for the author to be a Junior in the Society. Evidently this latter provision is, or is conceived to be, a great handicap. Surely the Juniors of the Society are qualified and able to write convincingly and interestingly, but just as surely they seem to avoid it. Perhaps it is the notorious engineering modesty which attacks the young man even more virulently than the older engineer. But the more probable reason is that the Junior does not wish to be known as a Junior and perhaps would prefer to wait until he can claim the title of a higher grade. By this attitude the grade of membership which was conceived by the earlier members to be one of great honor has become belittled by those who should be most active in maintaining its prestige. As a matter of fact, the Collingwood Prize is a greater honor relatively than the others, for it rewards the efforts of a young engineer judged on the same strict technical and literary bases as the writings of older and more mature men. As such, it should appeal to every Junior. The author of a noteworthy professional paper is not so much fulfilling his stipulated obligations to the Society as serving himself by the vigorous training of crystallizing his ideas. In all probability the prize was awarded fully as much to benefit the author as to advance the art—rewarding him, not because he is a Junior but because he really tries. In addition, the publication of such a paper marks the Junior as a probable coming leader in the profession. The Collingwood Prize should never lack a claimant.

The Oldest Member

Who is the Society's oldest Member? Few men know, possibly not even the member in question himself. If you should look through the Year Book, you would find one who became a Corporate Member on January 29, 1868. His name is Charles McMillan and he is listed as "Professor of Civil Engineering, Emeritus, Princeton University". His 57 years of continuous affiliation with the Society rank him as its oldest Member. Although for many years he has been a quiet resident of Princeton, N. J., Professor McMillan's early training

was wide in its scope. He was born in Moscow, Russia, in 1841, where he received extensive training before going to Hamilton, Ont., Canada, and from there to the Rensselaer Polytechnic Institute. For five years subsequent to his graduation, he followed various engineering occupations in the East, but since 1865 he has served as a professor of engineering successively in Rensselaer Polytechnic Institute, Lehigh University, and, beginning in 1875, at Princeton University. Thus, after such a varied early experience, his latter days have been comparatively undisturbed as becomes a dignified college professor. In its useful but unspectacular history, the life of the Society's oldest member is but typical of the average. All honor to him!

Side-Lights on Engineering Employment

A compilation of data relative to placements by the Engineering Societies Employment Service, covering a single month during the past summer, reveals several interesting points. The statistics as given herewith indicate the relation of men served, salary, and age. The table is of indefinite value, as far as the Society is concerned, as its record is uniformly an average one throughout. It is very noticeable, however, that Mechanical Engineers were particularly active during this period and Mining Engineers on the contrary

Society.	Number of men placed.	Total salary.	Average salary.	Average age in years.
Mechanical.....	57	\$147 020	\$2 597	30.7
Civil.....	28	69 760	2 490	28.8
Electrical.....	19	88 840	2 044	27.0
Mining.....	8	8 400	2 800	34.0
Totals.....	107	\$264 020	\$2 468	29.7

unusually quiet. Perhaps the most significant feature is the comparison of ages and salaries. Admitting that in one case the number of items is too small to reach a fair average, it is nevertheless remarkable that the salaries progress more or less in direct relation with the increasing ages. Inasmuch as all branches of engineering are represented, this would lead to the conclusion that engineers' salaries are comparable in terms of age and experience for any branch of engineering. It is a matter of further interest that the Society's contribution to the service works out in almost exact proportion to the civil engineering positions secured.

Irrigation Hydraulics Investigations

At a recent meeting of the Society's Special Committee on Irrigation Hydraulics held in San Francisco, Calif., November 6 and 7, 1925, interesting reports were made regarding projects in a number of important irrigation investigations. These studies are being carried on by members of the Committee on the following specialized topics: Evaporation Losses from Reservoirs; Evaporation from Soils; Losses in Canal Conversions; Water Move-

ment and Pressure Under Dams; Losses in Siphon Spillways; Silt Problems; Chutes and Drops; Scouring Below Dams; and Measuring Irrigation Deliveries.

Thanks are due to this important Committee for the energetic work in investigating these many important problems. Members who can add any information are urged to communicate with the Secretary of the Committee. The membership of the Committee consists of the following members: D. C. Henny, *Chairman*; J. C. Stevens, *Secretary*; B. A. Etcheverry, Julian Hinds, Robert A. Monroe, R. L. Parshall, J. L. Savage, F. C. Scobey, A. L. Sonderegger, and Franklin Thomas.

New Life Member

To most members the holiday season is not one of unmixed blessing; it brings with it the bill for annual dues. True, there are some who have anticipated this unpleasant event by compounding their dues or buying a paid-up annuity; but, in general, the bill comes at an inopportune time—in fact, a more unpopular time could hardly be imagined. But this is not true of all members. A certain select few receive at the same time a letter from the Secretary informing them that, having already paid dues for a long term of years, they are now, under the terms of the Constitution, exempt from further payment. In other words, they have become life members. The names of those who have thus just “reached their majority” in the Society deserve more than passing notice. The new names now added are as follows: Frederick W. Abbot, Henry C. Allen, Frederick C. H. Arentz, William T. Blunt, Edward Burr, Martin J. Caples, David S. Carl, Eugene Carroll, James R. Chapman, William C. Cushing, John Henry Darling, Edward M. Douglas, Emmett C. Dunn, George G. Earl, M. Ward Easby, Charles C. Elwell, James A. Fairleigh, John M. Farley, Felix Freyhold, Walter H. Gahagan, George E. Gifford, John M. Goodell, Thomas H. Grant, Carl E. Grunsky, Benjamin M. Hall, Edward A. W. Hammatt, Eugene E. Haskell, Edward Hayes, Francis E. House, Conway B. Hunt, George H. Hutchinson, James M. Johnson, William F. Jordan, Harry W. King, Eugene A. Landon, David W. Lum, Daniel W. Mead, Ralph Modjeski, Daniel E. Moran, Fred Morley, John E. Ostrander, Arthur L. Plimpton, Dwight Porter, Edward A. Rix, Alfred A. Stuart, T. Kennard Thomson, Edward E. R. Tratman, Job Tuthill, George C. Urquhart, Edmund F. Van Hoesen, Clement I. Walker, Edwin H. Warner, Albert L. Webster, George S. Webster, Daniel M. Wheeler, DeForest A. Wheelock, Reid Whitford, Frederick N. Willson, and Charles A. Wilson.

Fifty-nine members who either have paid dues as Corporate Members for 35 years or have reached the age of 70 after having paid dues for 25 years! Thirty-eight of these members belong in the 35-year class and the remaining 21 have had association with the Society for between 25 and 35 years. It is evident that during the years 1890 and 1900 there must have been a considerable influx of membership; furthermore, they were of the most desirable kind—the kind that stick. Also, they were widely distributed—or rather, according to their present residences, they are widely distributed—as shown by the following locations: Paris, France, 1; California, 5; Connecticut, 1; District

of Columbia, 5; Florida, 2; Georgia, 1; Illinois, 2; Kentucky, 1; Louisiana, 1; Massachusetts, 5; Michigan, 2; Minnesota, 3; Montana, 1; New Jersey, 3; New York, 14; Ohio, 2; Pennsylvania, 6; Tennessee, 1; Virginia, 2; and Wisconsin, 1. The occasion of such a large number of earned life memberships is food for thoughtful consideration. It furnishes striking evidence of the permanence of the Society as a worth while institution and reflects no little credit on those who have thus had their shoulders to the wheel of progress for so many years.

Appointments

Members have been appointed to act for the Society in various capacities, as follows:

Special Committee on Irrigation Hydraulics: D. C. Henny, *Chairman*; J. C. Stevens, *Secretary*; B. A. Etcheverry, Julian Hinds, Robert A. Monroe, J. L. Savage, F. C. Scobey, Arthur L. Sonderegger, and Franklin Thomas, Members, Am. Soc. C. E., and R. L. Parshall, Affiliate, Am. Soc. C. E.

Board of Trustees, National Museum of Engineering and Industry: J. Waldo Smith, M. Am. Soc. C. E.

Delegate to Attend Inauguration of Charles Christopher Mierow as President of Colorado College, at Colorado Springs, Colo., on December 5, 1925: Herbert S. Crocker, M. Am. Soc. C. E.

Delegate to Attend Inauguration of Parke Redford Kolbe as President of the Polytechnic Institute of Brooklyn, N. Y., on January 13, 1926: Robert Ridgway, President, Am. Soc. C. E.

December Society Meeting

At the December Meeting of the Society, held December 9, 1925, the topic under discussion was the "Utilizable Capacity of Steel Members of Structures", the subject being presented by Henry S. Prichard, M. Am. Soc. C. E., the author of a paper under that title printed in the November *Proceedings*. Mr. Prichard explained a number of interesting phenomena in the behavior of steel under stress, and drew a number of novel conclusions based on an intimate study of a large mass of stress data, and suggested the practical application of his principles to various types of steel members. Following this interesting talk, Messrs. F. E. Schmitt, G. B. Woodruff, and T. Kennard Thomson successively discussed the subject-matter of the paper. President Ridgway presided. The attendance was approximately seventy-five.

Engineering Commission on Federal Building Construction?

At a meeting of the Engineers Club of Philadelphia on October 27, 1925, Senator George Wharton Pepper, of Pennsylvania, made definite proposals of desirable engineering activities in the Federal Government. Coming from a man who is well known for his progressive conservatism, the remarks deserve the thoughtful reflection of all engineers. Quoting from Senator Pepper's address:

"But I do want, along the line of what has been suggested—The Engineer in Public Life—to make one tentative suggestion for your consideration. You men have all observed, I fancy, that during the last few years there has been an enormous growth in Federal bodies of all sorts." * * *

"And you have also noticed that there has been no program of public building construction which has in any way kept pace with the expanding needs of government. It was impossible that there should be anything of the sort during the war, and in the post-war period the struggle to re-establish financial stabilization has made an extensive building program impossible. But now there are real needs all over the country for Federal construction, and the Congressmen and Senators are being subjected to the heaviest kind of pressure by their constituents at home to relieve them from grave local inconvenience.

"Sooner or later that dam is going to burst. The flood is going to take either one of two courses—either it is going to sweep up in a kind of tidal wave a vast number of measures for local construction unrelated to one another and not in accordance with any agreement—and, ultimately, if unchecked, submerge the Treasury; or else that flood, when the dam breaks, is going to be taken up in channels scientifically prepared for it in advance. And so, we have the legislative engineering problem for the taking care of what otherwise would be a destructive eruption." * * *

"Now, the tentative suggestion I make is this: We have in the District of Columbia a Public Buildings Commission which is functioning very well. It is providing some sort of a basis for determining what appropriations should be made for construction and which ones should not, within the District. It is the point of contact between the executive and legislative departments. It is working out well." * * *

"I would like to see a commission created by Congress, reporting to Congress, on a national scale—similar to the Commission which is functioning effectively in the District. If such a commission were proposed, and proposed at the opening of Congress, it would go far toward making it possible to check unregulated, badly thought out, and ill-considered special legislation." * * *

"I should like to see some group like this—and I do not know of any group that could do it more effectually—take into consideration the advisability of uniting with representatives of the other groups, the architects and the contractors, and suggesting in due time, to the President, the making of a recommendation to Congress for a National Advisory Committee to study and report to Congress on a comprehensive scheme of development for Federal buildings throughout the United States.

"This, it seems to me, is an activity worthy of the very best intelligence and energy that you intelligent and energetic men possess; and I believe that in that kind of an approach you would be rendering a very great service to your country."

Investigation of Concrete and Reinforced Concrete Arches

One of the representative committees of the Society which is most active in its field is the Special Committee on Concrete and Reinforced Concrete Arches. The elaborate program which it is carrying forward includes extensive studies on arches under construction and elaborate tests of laboratory models. The field work on bridges at Conneaut, Ohio, and at Danville, Ill., is already completed and the results are being digested. Further projects under way or in contemplation include the Oliver Avenue and Kentucky Avenue Bridges (skew), at Indianapolis, Ind., the Clark's Ferry Bridge, at Harrisburg, Pa., three bridges in Nebraska, one a through arch, and a multiple-arch bridge at Piqua, Ohio. In addition, extensive tests of concrete model arches

have been conducted and are under way at the University of Illinois; there are also available four hard rubber skew arch models, the skews being 30° and 60°, which are expected to be tested at Princeton University. Not content with these extensive researches, the Committee is planning to design a multiple-arch reinforced concrete bridge for testing and has undertaken measures to effectuate this plan. The personnel of this active Committee consists of the following members: Clyde T. Morris, *Chairman*, G. E. Beggs, J. R. Chamberlin, E. H. Harder, A. C. Janni, and W. M. Wilson.

First Junior Prize Winner

The credit of originating the present popular plan for Local Sections to give Junior membership in the Society as a prize to graduating college students, goes to the Portland, Oregon, Section. Similarly, at least as far as the Society records show, the first award under this plan has also been made by the Portland Section. It is a pleasure to announce the first recipient of this honor as Mr. H. F. Jerauld, of the Class of 1925, Oregon Agricultural College, Corvallis, Ore. Of the young men who make such auspicious beginnings in their Society work, much may be confidently expected.

International Critical Tables

A monumental compilation representing a money value of more than half a million dollars has been carried out under the auspices of the National Academy of Sciences and the National Research Council, and has resulted in a publication entitled "International Critical Tables of Numerical Data of Physics, Chemistry and Technology", soon to be published. As collected by about three hundred experts from all the chief nations of the world, the material covers all the available information of value concerning the physical properties and numerical characteristics of (a) pure substances; (b) mixtures of definite composition; (c) the important classes of industrial materials; (d) many natural materials and products; and (e) selected data for selected bodies or systems, such as the earth and its main physical sub-divisions and the solar and stellar systems. The mass of data requires an estimated 2 500 pages and will be included in five volumes. Because of the affiliation of the Society with this important work, members are offered the privilege of subscribing to these International Critical Tables, provided they give their orders before the first volume is issued (early in 1926), at the special price of \$35 for the set. Orders may be placed with the National Research Council, B and 21st Streets, N. W., Washington, D. C.

A Platform for Engineering Foundation

An Announcement

Engineering advances by continual gain and diffusion of new knowledge. Organizing for effective conduct of research under the auspices of the four National American Societies of Civil, Mining and Metallurgical, Mechanical,

and Electrical Engineers, has, however, not been a simple task. Nevertheless, important progress has been made recently.

Technical investigations have been conducted by these Societies severally for years; but there has been little correlation and no comprehensive program. Only within a decade have engineers come to understand research in the same sense as scientists. Ambrose Swasey, Hon. M. Am. Soc. C. E., by his far-sighted suggestion in 1914 of an engineering research foundation, and a gift for the beginning of its endowment, compelled study of this problem.

Then came the great war and the organizing of scientists and technologists to aid the Government should our country become involved, as in 1916 appeared inevitable. Engineering Foundation assisted, therefore, in establishing National Research Council and co-operated with it through the war and reconstruction. Indeed, it has been said repeatedly that if the Foundation had accomplished nothing else, this service alone would have justified Mr. Swasey's gift. Scientists and engineers repeatedly gave practical demonstration of the usefulness of research in meeting war emergencies. In peace, also, wisely directed co-operative research can be useful, for it can aid in solving urgent problems, and, besides, add to the store of knowledge on which are based progress in industry, advancement of engineering practice, and improvement of technical education, for the greater satisfaction of human needs and desires.

In 1923, Engineering Foundation again found itself facing its primary problem, but with experience accumulated and useful work done. Its Founder Societies in the interval had progressed in research and in development of their organizations and their joint relations. Together they attacked again this problem so important to the Profession and the country. Naturally there has been variety in conception of the form and functions of the Foundation and of the relations between it and the Societies. Out of prolonged consideration a plan has emerged which assures progress and achievement. Its fundamentals are embodied in a Platform for Engineering Foundation, adopted at a meeting of its Board, December 10, 1925, after approval of a draft by the governing body of each Founder Society, based on a unanimous recommendation of their Joint Conference Committee, composed of their Presidents and Secretaries.

PLATFORM FOR ENGINEERING FOUNDATION

Desiring to promote active and wisely directed research as a means to scientific and technical progress and believing that systematic co-operation by Engineering Foundation and the several Founder Societies is essential to any development of the research work of the Societies commensurate with the dignity, influence, and resources of the Profession, Engineering Foundation, while reserving entire liberty of action under the authority conferred upon it by the Founder Societies, through United Engineering Society, adopts the following declaration of its present plan and policy:

- 1.—Engineering Foundation regards engineering research as the preferred field for its activities.
- 2.—It will select or approve specific researches which it will assist by appropriation of funds or otherwise.

- 3.—It will select for each project the agency, collective or individual, which it deems most effective.
- 4.—It will assume no direct responsibility for the prosecution of any specific research.
- 5.—It will co-operate with the National Engineering Societies and preferably support researches approved by it sponsored by one or more of them.
- 6.—A member of Engineering Foundation, or of its staff, may be an advisory, but not an active, member of any committee or other organization in immediate charge of a research assisted financially by the Foundation. This provision will not be retroactive.
- 7.—Engineering Foundation reserves the right to require from committees or other organizations or individuals assisted, satisfactory progress reports as a condition of continued support.
- 8.—Engineering Foundation will co-operate with the several Founder or other National Engineering Societies in raising funds for the prosecution of approved researches.
- 9.—It will endeavor to prevent conflict or overlap of research effort among the agencies which it supports or assists.
- 10.—It will co-operate in securing information of the state of the art for use of committees of the Founder Societies or other agencies.

Adoption of this plan has placed the impartial and judicial attitude of Engineering Foundation beyond the questions which, without it, inevitably would have arisen when the Foundation in future determined allotment and use of large sums.

Under the policy adopted, researches conducted by the Founder Societies will be doubly safeguarded in their selection, since they will have passed independent approval by the board of a Founder Society and by Engineering Foundation. Likewise, collective wisdom will be exercised in the use of funds entrusted to Engineering Foundation and to the Founder Societies.

A project having been thus endorsed, members of the Founder Society advocating it should be effective, directly or through Engineering Foundation, in raising funds or securing other aid by appeal to those who may expect to benefit.

And the time may not be far distant when the intelligence of those who have benefited from engineering will perceive the advantage to be derived for the Profession, for Industry, and for the Public, from providing Engineering Foundation so adequately with funds that effort and time now expended in solicitation, with all the incidental annoyances and waste, may be conserved for earlier attainment of benefits sought.

L. B. STILLWELL, Chairman,

ALFRED D. FLINN, Director,

Engineering Foundation.

The German Museum in Munich

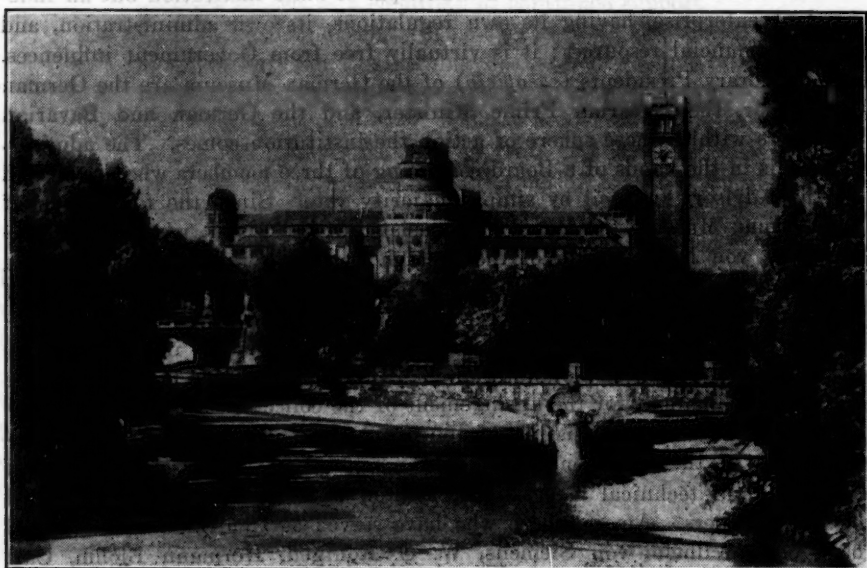
The German Museum in Munich shows the development of the various branches of natural science and technology by means of original apparatus and machines, as well as by means of models and arrangements for demonstration, in a manner easily understood by all classes of people. Its purpose is to instruct students, workers, etc., as to the effects of the multifarious applications of science and technology to the problem of human existence, to stimulate further progress, and to keep alive in the whole people a respect for great investigators and inventors and for their achievements in natural science and technology. That all this is possible is shown by the attendance at the Museum since its opening in May, 1925, for in a city of about 600 000 inhabitants the collections have been visited by about 6 000 on each week day and by about 12 000 on Sundays and holidays.

The German Museum is not a municipal or state institution but an independent enterprise, having its own regulations, its own administration, and its own financial resources; it is virtually free from Government influences. The Honorary Presidents (*ex-officio*) of the German Museum are the German Chancellor, the Bavarian Prime Minister, and the German and Bavarian Ministers within whose sphere of action the institution comes. The administration is in the hands of a Board consisting of three members who are elected by the Advisory Council by simple majority vote. Since the foundation of the German Museum the Board has consisted of the writer, who is its Chairman, Dr. von Dyck, Rector of the Munich Technical Institute, and, until a few years ago, Dr. C. von Linde, the pioneer investigator in the field of refrigeration. After Dr. Linde retired, he was succeeded by Dr. Kerschens-
steiner whose work in teaching is well and favorably known in America.

The Board conducts the affairs of the Museum and is specially responsible for the building, and for the arrangement of the collections. It is assisted by an Advisory Council consisting of 100 members, including permanent representatives of the Commonwealth, of the administration in power, and of scientific and technical associations, as well as a number of distinguished elected members. Among those who have served as Chairmen of the Board have been Wilhelm von Siemens, W. C. Röntgen, Hermann Blohm, Carl Duisburg, Krupp von Bohlen, His Excellency von Harnack, and Count Zeppelin. For the assistance of the Board and the Advisory Council there is at present a committee of about 600 members composed of specially prominent and influential persons representing all the branches of natural science and technology covered by the Museum. The importance of this Committee does not inhere in its collective activities but especially in the fact that the individual members are consulted in important special questions, such as the discovering and procuring of certain exhibits for the Museum, the development of important demonstration equipment, etc.

The Museum includes a construction bureau comprising about 15 employees, a scientific-technical bureau comprising 49 persons, as well as 60 museum custodians, comprising mostly mechanics, laboratory attendants, miners, etc. The plan for the German Museum was submitted by the writer

on May 5, 1903, to a small, select group of men, and met with such immediate approval at their hands that on June 28 of the same year the Museum was established under the patronage of the then Prince Ludwig of Bavaria. The collections, which rapidly accumulated, were temporarily housed in the old National Museum and in the Isar Barracks, where about 140 000 sq. ft. of floor space was available, and were opened to the public for the first time on November 15, 1906. On the same day the ceremony of laying the cornerstone of the new Museum building took place, the plans prepared by Professor Gabriel von Siedl being already completed. In spite of the extremely difficult conditions caused by the World War and the subsequent period of inflation, it has been possible to complete the new Museum building on an island in the River Isar provided by the municipality of Munich, thanks to the very general, self-sacrificing, and unremitting support received.



VIEW OF GERMAN MUSEUM BUILDING, MUNICH.

The new building was opened on May 7, 1925, and the unusually extensive festivities celebrating the event were shared not only by all the people of Munich, but also by the heads of the German Government and the German Federated States, representatives of allied academies, polytechnic institutes, and museums, and by representatives of numerous non-German scientific and technical associations. The Museum building at present has altogether about 430 000 sq. ft. of floor space, partly in rooms and partly in halls, for the reception of exhibits. Although the collections are limited to the branches of the exact natural sciences and those branches of technology which are specially aided by scientific research, there are nevertheless more than sixty groups represented in its six main divisions.

The first of these main divisions comprises Geology, as well as Mining and Metallurgy, in which replicas of ore, coal, and salt mines are shown. Each group is introduced by an ensemble plan clearly showing the various branches exhibited therein. In all the groups of the German Museum not only is the present status of science and technology illustrated, but also their development from the most ancient times to the present, and the sole criterion used in the selection of exhibits has been that they shall represent an important stage of development.

In connection with the Mining Group smelting methods with blast furnaces, Bessemer converters, Siemens-Martin plants, etc., are shown. Then follows the development of prime movers from the primitive treadmills of the Middle Ages up to the windmills, water wheels, turbines, and steam engines of the present. To elucidate this group a full-sized working model of Watt's engine, the first Sulzer engine, a steam turbine in section, etc., are shown. Near by the development of the gas engine and Diesel engine—which mainly took place in Germany—is illustrated by exhibits of the original engines.

Considerable space is devoted to transportation, showing not only the oldest devices for conveying loads and persons—the Roman war chariots, the sedan chairs of the Middle Ages, etc.—but also a complete presentation of the development of the locomotive, including an excellent replica of the English "Puffing Billy" in working order, the first electric locomotive built by Werner Siemens, etc., as well as the development of railway cars, including a very fine model of the first Pullman car. Close by are representations of highways, railroad tracks, bridges, and waterways, among which original parts of Brooklyn Bridge in New York, N. Y., an especially fine model of the Panama Canal, and views of New York Harbor are reminders of the progress made in America. A large part of the group, "Transportation," is devoted to the division of shipbuilding, the development of which is shown from the ancient ships of the Phœnicians, Roman galleys, Viking ships, the caravels of Christopher Columbus, old English battleships, and the celebrated ships of the Hansa towns, down to the huge vessels of the present time. Among the latter is the battleship *Rheinland*, the model of which is so arranged that by removing its sides, the machinery and interior equipment are exposed to view. The group, "Aeronautics," not only contains Lilienthal's flying machine, the first machine for that purpose ever built, but also one of the first Wright biplanes and presents in orderly sequence the whole development of lighter-than-air craft up to the most recent all-metal planes of Junkes, Dornier, etc. Among the airships shown are the first dirigible Zeppelins and the airships of Gross and Parseval—historical masterpieces of the first rank.

The groups, "Physics" and "Chemistry," in addition to original apparatus used by the most prominent investigators, also contain equipment for demonstration, intended to facilitate proper appreciation by visitors of scientific achievements and to interest them in the progress of natural sciences and technology. The apparatus for demonstration is placed side by side with the original apparatus so that visitors may carry out the necessary experiments themselves.

Among the more notable sets of original apparatus in these groups may be mentioned the original air pumps and hemispheres of Otto von Guericke; the optical apparatus of Fraunhofer, Helmholtz, Kirchhoff, Bunsen, and others; the original apparatus used by Robert Mayr, Joule, Linde, etc.; the first telephones of Reis and Bell; Edison's phonographs; original apparatus of Ohm, Steinheil, Gauss, Weber, etc.; the original experimental Hertzian wave apparatus; the first Röntgen tubes, etc.

Among the demonstration apparatus which have become known best are the two planetariums constructed by the Zeiss Company and embodying the ideas of the President of the Museum. The first planetarium, built on the theory of the Greek philosopher Ptolemy, consists of a sphere 8 m. (26.2 ft.) in diameter representing the heavens, in the dark interior of which the spectators are admitted. In order to facilitate orientation, the horizon is on a level with the eyes. By means of a rotating projecting apparatus placed in the center, luminous figures of the fixed stars are projected on to the dark heavens in their apparent movement round the earth, and by special apparatus the apparent movement of the sun, moon, and planets, thus enabling any one to reproduce the movements corresponding to a year or a day in greater or less time. The planetarium shows with special characteristics the rising and setting of the sun, the moon, the partly retrograde motions of planets, etc.

A second (Copernican) planetarium of the same size shows the actual movement of the stars. Here the sun and fixed stars are stationary, the earth and planets moving in the ecliptic around the sun. Below the earth a moving platform is provided, on which the spectators stand in order to participate in the movement of the earth through space, and so that they may form a proper conception of the actual position of the stars among themselves and as against the earth at any time of day or season.

In the field of Astronomy, astronomical instruments and models of entire observatories, including a model of a turret equatorial telescope, etc., are shown; three large observatories of different periods enable the visitors to make observations on the heavenly bodies themselves.

The fourth main division of the Museum comprises the paper and textile industries and agriculture; the textile-machinery division including numerous English inventions, and the agricultural division, important American productions, for example, the McCormick mowing machines, etc.

The last of the five main divisions is now in course of installation, namely, the dwelling-construction and town-building group, with its divisions of gas, water supply, electrical plants, etc. Here also are represented American masterpieces which were secured by the writer on his visit to America in 1912, for instance, the model of the Woolworth Building, which, however, has not yet arrived in Munich.

At the center of the collections described is a Hall of Fame containing portraits and busts of the most prominent German scientists and technicians with inscriptions referring briefly to their achievements, the purpose of which is to perpetuate the memory of the greatest masters of German science and technology. Among these may be mentioned the life-size portraits of Otto von Guericke, Leibnitz, Fraunhofer, and Gauss, the reliefs of Werner Siemens and

Alfred Krupp, the hermæ of Robert Mayr and Helmholtz, the bronze tablets of Otto Lilienthal, Count Zeppelin, etc. The portraits of non-German investigators and engineers such as Faraday, Watt, Lavoisier, Ampère, Berzelius, Franklin, Galileo, etc., are suitably disposed in the divisions in which are exhibited the apparatus devised by them.

The Museum has still to be completed by a library building. In this, visitors should find all books treating of natural science and technology, and especially of their history, to supplement the studies they have made of the collections in the Museum. In addition to this extensive collection of books there will be a collection of designs and plans to give students, mechanics, and workmen an opportunity of finding standards covering any problem on which they may be working. Furthermore, the library building will have spacious halls provided with the most modern equipment in which lectures may be delivered to large audiences with the aid of models and Museum exhibits, thus contributing to a more profound appreciation of science and technology.

Only a part of the money for building the German Museum, for arranging the collections, and for operation has been provided by the German Government, by Bavaria, and by the City of Munich. Most of it has come from funds contributed by the German people at large, and in this way the Museum has become an enterprise which has united a multitude of citizens in the pursuit of a common aim.

Although the building of the Museum has in this way brought together scientists, engineers, workers, etc., the use of the facilities will be more effective in this respect, for visitors will see that all classes of people take part in the achievements of modern life. Workmen will see what laborious mental work was necessary by the greatest investigators in order to lay the foundations of technology, and how great has been the ability of those who, starting with simple workshops, have created the industries. Members of the privileged classes will learn in the German Museum how toilsome and difficult is the work of laborers, for instance, in the mines, and what great skill mechanics must have in order to make the instruments, apparatus, and machines which engineers have invented and designed. The German Museum will waken in them the feeling that the workers not only are entitled to wages but also to respect, and through this there will come about a more intimate sense of partnership between all working classes. Moreover nations also will be drawn together, for the Museum shows that achievements in science and technology are not due to any one people, but that all peoples have contributed to bring them about.

DR. OSKAR VON MILLER,

Chairman, Board of German Museum.

Local Sections*

Arizona.—November 7, 1925. Annual Meeting. The following officers were elected: President, W. W. Lane; First Vice-President, John W. B. Blackman; Second Vice-President, Claude W. Miller. Special Committees were authorized on Irrigation Districts, Highways, City Planning, and Structural Materials. After the Presidential Address by retiring President G. E. P. Smith, the following papers were read: "Verde River Irrigation Project", by Mr. J. G. Bailhache; "Beardsley Agua Fria Project", by Mr. C. E. Griggs; "Measuring Stick for Weirs", by Mr. T. A. Hayden; "Power Development by the Salt River Valley Water Users' Association", by Mr. R. G. Baker; and a résumé of Professor W. K. Hatt's paper entitled "The Effect of Moisture on Concrete", by Mr. B. A. McNelly. The social features of the meeting included a joint luncheon with the Local Chapter of the American Association of Engineers and banquet and dance in the evening.

November 8, 1925. An inspection trip was made to the Mormon Flats re-regulating reservoir where a 10 000-h.p. turbine is being installed and to the site of the Horse Mesa power dam where stripping of the abutment walls is in progress. Attendance 25.

Baltimore.—November 10, 1925. The meeting was addressed by J. N. Mackall, Chairman and Chief Engineer of the State Roads Commission of Maryland, on "The State Roads of Maryland."

Dayton.—November 16, 1925. The program for the meeting consisted of a talk by Mr. Segoe, of the Technical Advisory Corporation, who described the traffic studies made in connection with the proposed thoroughfare system for Dayton. Attendance 25.

Detroit.—November 9, 1925. Annual Meeting. The following officers were elected: President, J. P. Hallihan; Vice-Presidents, George H. Fenkell and Frederick G. Ray; Secretary-Treasurer, F. H. Stephenson. The Section voted to establish a prize to consist of initiation fee and one year's dues as a Junior in the Society to be competed for by members of the Senior Class of the Student Chapter at the University of Michigan. Attendance 20.

Louisiana.—November 16, 1925. This was a business meeting in which matters of interest to the Section were discussed, including the establishment of a Student Chapter at Tulane University or at the Louisiana State University and offering prizes to students.

New York.—November 18, 1925. The New York Section participated with the Local Sections of the other three Founder Societies and the Engineering Section of the National Safety Council in an "Accident Prevention Conference". This Conference was arranged to emphasize the obligation of the Engineering Profession to participate actively in a campaign to reduce the present losses from preventable accidents. Morning, afternoon, and evening sessions were held which were presided over by the Presidents of this Society, the American Society of Mechanical Engineers, and the American Institute of Electrical

* For list of Local Section Officers, Rules, etc., see 1925 Year Book, p. 48.

Engineers, respectively. The papers covered the economic aspects of safety, organization for accident prevention, standardization, education, and safety in mines. About 550 persons attended the Conference.

Northwestern.—October 23, 1925. The meeting was held at the Minneapolis Athletic Club, Minneapolis, Minn. After the business meeting the following officers were elected: President, Frederic Bass; First Vice-President, A. S. Cutler; Second Vice-President, G. H. Hutchinson; Secretary-Treasurer, E. G. Briggs. Mr. George L. Wilson gave a verbal report on the Fall Meeting of the Society at Montreal, Que., Canada, in October, which he attended as a Representative of the Section. Mr. Henry Deutsch, an attorney of Minneapolis, spoke on "Commercial Arbitration". Four members of the Student Chapter at the University of Minnesota were guests of the Section. Attendance 17.

Philadelphia.—November 2, 1925. This was a joint meeting of the Section with the Society of Municipal Engineers and the Engineers Club. The meeting was preceded by a dinner at which 72 members and guests were present. The subject under discussion was "Working Stresses in Steel, Concrete and Timber". Discussions were presented by Messrs. Manton E. Hibbs, Structural Engineer, Bureau of Building Inspection, Philadelphia; S. C. Hollister, Consulting Engineer, Philadelphia; W. A. Slater, Physicist, Bureau of Standards, Washington, D. C.; F. C. Cartwright, of the Building Code Committee, Washington, D. C.; F. E. Schmitt, Associate Editor, *Engineering News-Record*, New York, N. Y.; F. M. Masters, Consulting Engineer, Harrisburg, Pa.; and J. R. Worcester, Consulting Engineer, Boston, Mass. Other members and guests spoke informally. Attendance 95.

Portland, Ore.—October 23, 1925. After the business meeting, the address of the evening was delivered by Mr. R. E. Koon on the subject of "Sewage Disposal". Mr. Koon received a vote of thanks on the excellency of his paper. Dr. F. V. Stricker, Secretary of the State Board of Health, was a guest at the meeting and contributed a very interesting discussion. Attendance 29.

Student Chapters*

Ole Mississippi (University of Mississippi).—October 8, 1925. Following the business meeting, Mr. G. E. Tomlinson made a few remarks on the "Spirit of Ole Mississippi Engineers". Dr. McLeod gave an interesting and instructive address on "Ethics of Engineering".

Robert H. McNeilly (Vanderbilt University).—The Chapter which has been organized recently, was named in honor and commemoration of the late Robert Hugh McNeilly, Assoc. M. Am. Soc. C. E., Professor of Civil Engineering at the University, who lost his life on May 8, 1925, when the steamer *Norman* sank in the Mississippi River. A program for the activities of the year is being prepared, including inspection trips to various road projects under construction near Nashville. The Chapter will also publish a magazine.

* For list of Student Chapters, Officers, etc., see 1925 Year Book, p. 54.

Engineering Societies Library

The services of the Engineering Societies Library are available to all members who wish searches, copies, translations, etc., or advice on technical literature. A collection of modern books is also available for loan to members in North America, at moderate rentals. Correspondence should be addressed to the Director, Engineering Societies Library, 29 West 39th Street, New York, N. Y., who will gladly give information concerning the charges for the various kinds of work. A more comprehensive statement in regard to this matter will be found on pages 71 and 72 of the Year Book for 1925.

Book Notices*

(November 1 to November 30, 1925)

Analysis of Railroad Operations. By Joseph L. White. N. Y., Simmons-Boardman Pub. Co., 1925. 381 pp., tab., 9 x 6 in., fabrikoid. \$4.00.

This book aims to prepare the railroad man, even one unfamiliar with the technical details of railway accounting, to interpret the accounting and statistical statements of a railroad and to analyze its operating results.

Early British Railways, 1801-1844. By Henry Grote Lewin. Lond., Locomotive Publishing Co.; N. Y., Spon & Chamberlain, 1925. 202 pp., illus., maps, 9 x 6 in., cloth. 12s 6d.

Beginning with the horse line from Wandsworth to Croydon, sanctioned by an Act of Parliament in 1801, Mr. Lewin traces the development of the railroads of Great Britain from a traffic viewpoint, shows how the present system has come into being, and notes the gradual progress of Parliamentary control.

Foundations of Bridges and Buildings. By Henry S. Jacoby and Roland P. Davis. N. Y., McGraw-Hill Book Co., 1925. 665 pp., illus., diagrams, 9 x 6 in., cloth. \$6.00.

This new edition, revised and amplified, treats of piles and pile-driving, coffer-dams, caissons, piers, abutments, spread foundations, and underpinning. It is intended to present American practice on the entire subject of foundations in a systematic manner.

Freight Terminals and Trains. By John A. Droege. Second Edition. N. Y., McGraw-Hill Book Co., 1925. 567 pp., illus., diagrams, 9 x 6 in., cloth. \$6.00.

This is a treatise on freight transportation in all its ramifications, written from the viewpoint of the engineers who plan and build the various plants that form the organization, and of the officers who operate them. The present edition has been enlarged by chapters on electrical operation and on the integration of freight transportation.

Making of a Railroad Officer. By Robert E. Woodruff. N. Y., Simmons-Boardman Pub. Co., 1925. 245 pp., port., 8 x 5 in., cloth. \$2.00.

This book is an unconventional talk by an experienced railroad man to the beginner in railway service, calling attention to many practical matters that influence success or failure. Most of its observations are equally applicable in other fields.

Making, Shaping, and Treating of Steel. By J. M. Camp and C. B. Francis. Fourth Edition. Pittsburgh, Pa., Carnegie Steel Co., 1925. 1142 pp., illus., diagrams, tab., 8 x 5 in., fabrikoid. \$7.50. (Payment should accompany order. Money orders and checks to be made payable to Carnegie Steel Co.)

* The statements made in these notices are taken from the books themselves, and this Society is not responsible for them. Unless otherwise specified, the books in this list have been donated by publishers.

Orders and inquiries should be addressed to Carnegie Steel Co., Bureau of Technical Instruction, Carnegie Bldg., Pittsburgh, Pa.)

Although this book is intended primarily as a textbook in the schools of the United States Steel Corporation for employees without a technical education, it is admirably adapted to general use. Beginning with a survey of those principles of physics and chemistry which are useful to the metallurgist, the authors describe refractories, iron ores, fuels and fluxes. The manufacture of pig iron, wrought iron, and steel are then discussed. Section 2 is devoted to the shaping of steel by rolling and forging. Section 3 treats of the constitution, heat treatment, and composition of steel, and Section 4 describes the manufacture of wire, sheets, pipe, and tubes. It is thus a complete account of the industry, from the ore to the semi-finished product, prepared by men in intimate contact with current practice.

Der Talsperrenbau, Bd. 1. By P. Ziegler. Third Edition. Berlin, Wilhelm Ernst & Sohn, 1925. 247 pp., illus., diagrams, tab., 10 x 7 in., paper. 24 gm.

In this treatise on earth and rock-fill dams, the author discusses the theory underlying design, investigates various cases of failure and draws lessons from them, and gives detailed descriptions of many typical dams in various countries.

Treatise on the Law of Public Utilities. By Oscar L. Pond. Third Edition. Indianapolis, Bobbs-Merrill Co., 1925. 1065 pp., 10 x 7 in., buckram. \$10.00.

This endeavor to give a full, impartial exposition of the law of municipal public utilities is based on the decisions of the Courts and of various commissions, so that it is authoritative and practical. The new edition contains an extended study of motor vehicle transportation and a chapter on the subject of appeals.

Additions to the Reading Room

Locating the Iron Trail. By Edward Gillette, M. Am. Soc. C. E., Bost., Christopher Publishing House, 1925. 172 pp., illus., 8 x 5 in., cloth. \$2.00. (Gift of the Author.)

The object of this book is to call attention to the great development following the location of the railroad in Western United States which transformed what had been called the Great American Desert into the richest and consequently the greatest productive region in the world.

The Bureau of Standards, Its History, Activities, and Organization. By Gustavus A. Weber. (Institute for Government Research, Service Monographs of the United States Government, No. 35). Balt., Johns Hopkins Press, 1925. 299 pp., 8½ x 5½ in., cloth. \$2.00.

This volume describes the functions of the Bureau of Standards which include the development, construction, custody, and maintenance of reference and working standards, and their intercomparison, improvement, and application in science, engineering, industry, and commerce.

The World Court. By Antonio Sanchez de Bustamante. Translated by Elizabeth F. Read. N. Y., The Macmillan Company, 1925. 379 pp., 8½ x 5½ in., cloth. \$3.00. (Gift of The American Foundation.)

This is the first authoritative account of the World Court to appear in the English language. The book describes clearly and in detail the functions of the Court so that it can be easily understood by the general reader and will greatly aid in presenting the subject in its true perspective.

Current Civil Engineering Literature

Key to Abbreviated References to Publications Indexed*

Abbreviated References.	Publication.	Place.
Am. C. Inst.....	American Concrete Institute, Proceedings (Y.)	Detroit
A. I. E. E.....	American Institute of Electrical Engineers Journal (M.)	New York
A. R. E. A.....	American Railway Engineering Association, Proceedings (Y.)	Chicago
A. S. T. M.....	American Society for Testing Materials, Proceedings (Y.)	Philadelphia
Am. Soc. C. E.....	American Society of Civil Engineers, Proceedings (M.)	New York
Am. Soc. Mun. Impvts.....	American Society for Municipal Improvements, Proceedings (Y.)	New York
Am. W. W. Assoc.....	American Water Works Association, Journal (BI-M.)	Baltimore
Am. Wood Pres. Assoc.....	American Wood Preservers Association, Proceedings (Y.)	Chicago
Ann. P. et C.....	Annales des Ponts et Chaussées (BI-M.)	Paris
Ann. T. P. Belg.....	Annales des Travaux Publics de Belgique (BI-M.)	Brussels
Assoc. Ing. Gand.....	Annales de l'Association des Ingénieurs sortis des Ecoles Spéciales de Gand (Q.)	Ghent
Bost. Soc. C. E.....	Boston Society of Civil Engineers, Journal (M.)	Boston
Can. Engr.....	Canadian Engineer (W.)	Toronto
Cornell C. E.....	Cornell Civil Engineer (M.)	Ithaca
Dock & Harbour.....	Dock and Harbour Authority (M.)	London
Eng.....	Engineering (W.)	London
Eng. & Contr.....	Engineering and Contracting (W.)	Chicago
Eng. Inst. Can.....	Engineering Institute of Canada, Journal (M.)	Montreal
Eng. N. R.....	Engineering News-Record (W.)	New York
Engrs. Soc. W. Pa.....	Engineers' Society of Western Pennsylvania, Journal (M.)	Pittsburgh
Engr.....	Engineer (W.)	London
Engrs. & Eng.....	Engineers and Engineering, Engineers' Club of Philadelphia (M.)	Philadelphia
Gen. Civ.....	Le Génie Civil (W.)	Paris
Gesund. Ing.....	Gesundheits Ingenieur (W.)	Munich
Inst. C. E.....	Institution of Civil Engineers Minutes of Proceedings (Q.)	London
Inst. Mun. & Co. Engrs.....	Institution of Municipal and County Engineers, Journal (W.)	London
Int. Ry. Cong. Assoc.....	International Railway Congress Association, Bulletin (M.)	Brussels
Land. Arch.....	Landscape Architecture (M.)	Harrisburg
Mech. Eng.....	Mechanical Engineering (M.) Journal of the American Society of Mechanical Engineers	New York
Mil. Engr.....	Military Engineer (M.)	Washington
Min. & Metal.....	Mining and Metallurgy (M.) American Institute of Mining Engineers	New York
Mun. & Co. Eng.....	Municipal and County Engineering (M.)	Indianapolis
N. E. W. W. Assoc.....	New England Water Works Association, Journal (M.)	Boston
N. Y. R. R. Club.....	New York Railroad Club, Proceedings (M.)	Brooklyn
Oest. Ing. Arch. Ver.....	Oesterreichischer Ingenieur und Architekten Verein, Zeitschrift (F.)	Vienna
Power.....	Power (W.)	New York
Rev. Gen.....	Revue Générale des Chemins de Fer (M.)	Paris
Ry. Age.....	Railway Age (W.)	New York
Ry. Eng. & Main.....	Railway Engineering and Maintenance (M.)	Chicago
Ry. Rev.....	Railway Review (W.)	Chicago
Schw. Bauz.....	Schweizerische Bauzeitung (W.)	Zurich
Sci. Am.....	Scientific American (M.)	New York
Soc. Ing. Clv. Fr.....	Société des Ingénieurs Civils de France, Mémoires et Comptes Rendus (Q.)	Paris
Ver. deu. Ing.....	Verein deutscher Ingenieure, Zeitschrift (W.)	Berlin
West. Ry. Club.....	Western Railway Club, Proceedings (M.)	Chicago
West. Soc. Engrs.....	Western Society of Engineers, Journal (M.)	Chicago
Zelt. Bau.....	Zeitschrift für Bauwesen (Q.)	Berlin
Z. d. Bauver.....	Zentralblatt der Bauverwaltung (W.)	Berlin

* Y = Yearly; Q = Quarterly; M = Monthly; F = Fortnightly; W = Weekly.

A. Applied Sciences**a. Processes of Calculation**

Utilizable Capacity of Steel Members of Structures.* Henry S. Prichard. Am. Soc. C. E. Nov., '25.

B. Applied Mechanics**a. Mechanics of Solids (Strength of Materials)****2. Elastic Solids**

Synchronous Torsional Vibrations.* John F. Fox. Mil. Engr. Nov.-Dec., '25.

7. Pulverulent Masses (Earth Pressure)

Principles of Soil Mechanics: 1-Phenomena of Cohesion of Clay.* Charles Terzaghi. Eng. N. R. Serial beginning Nov. 5, '25.

b. Hydraulics**2. Physical Hydraulics**

The Investigation of the Surge-Tank Problem by Model Experiments.* Arnold Hartley Gibson. Inst. C. E. Vol. 219, Pt. 1, 1924-'25.

The Flow of Water in Pipes and Channels.* Frank Heywood. Inst. C. E. Vol. 219, Pt. 1, 1924-'25.

3. Industrial Hydraulics

Hydraulic Regulating Gates.* F. Newell. Eng. Inst. Can. Nov., '25.

Some Problems at Niagara Falls. Can. Engr. Nov. 3, '25.

Capital Costs of Sheet Harbor System.* Harold S. Johnston. Can. Engr. Nov. 3, '25.

Les Canaux d'Amenée en Charge et les Cheminées d'Equilibre des Usines Hydrauliques.

(Pressure Conduits and Surge-Tanks on Water Power Plants.) Gen. Civ. Oct. 10, '25.

4. Dams

Der Bruch der Gleno-Talsperre nach dem amtlichen und anderen Gutachten.* (The Failure of the Gleno Reservoir Dam According to the Official and Other Reports.) Adolf Ludin.

Zeit. Bau. Pt. 7, '25 (Ingenieurbau).)

c. Pneumatics**2. Physical Pneumatics**

Report on the Measurement of the Pressure of the Wind on Structures.* Thomas Ernest Stanton. Inst. C. E. Vol. 219, Pt. 1, 1924-'25.

C. Materials of Construction and General Processes**a. Lime, Cement, Mortar, Concrete, Brick, Bitumen, Timber, Gravel, etc.**

Exterior Finish of Concrete Surfaces. George E. Horr. (From Turner Constructor.)

Eng. & Contr. Oct. 28, '25.

Concrete Deterioration in Alkali Soils. C. J. Mackenzie. Eng. Inst. Can. Nov., '25.

b. Metals

L'Usure et la Corrosion dans les Ouvrages Métalliques.* (Wear and Corrosion in Metal Products.) Jean Jacquot. Ann. P. et C. Pt. 4, '25.

c. Preservation and Use of Materials

The Rustproofing of Materials.* M. E. McDonnell. Mech. Eng. Nov., '25.

The Penalty of Dead Load.* (From American Architect.) Can. Engr. Nov. 10, '25.

f. Rock Excavation, Mining, Rock Removal

Abstract of Institute Papers. Min. & Metal. Nov., '25.

g. Execution of Works, Specifications**2. Of Concrete**

The University of Pittsburgh Stadium. W. S. Hindman. Engrs.' Soc. W. Pa. Oct., '25.

Method of Casting and Setting Concrete Posts.* Eng. & Contr. Oct. 21, '25.

The Use of Precast Concrete Units.* (Am. Ry. Bridge & Bldg. Assoc.) Ry. Eng. & Main.

Nov., '25.

A Manual for Building and Operating Sliding Forms.* R. F. Egelhoff. Eng. N. R.

Nov. 12, '25.

Rapport de la Commission Instituée pour l'Etude de l'Emploi du Béton Malgre dans la

Construction des Habitations a Bon Marché.* (Report of the Commission Formed for the

Investigation of the Use of Lean Concrete in the Construction of Cheap Dwellings.)

Ann. T. P. Belg. Pt. 4, '25.

Die Verteilungsanlagen für Gussbeton.* (Concrete Distributing Plant.) Heribert Fernau. Oest.

Ing. Arch. Ver. Serial beginning Oct. 2, '25.

4. Of Metal

Die deutschen Werkstoffnormen für Stahl und Eisen.* (German Standards for Iron and

Steel.) E. H. Schulz. Ver. deu. Ing. Oct. 24, '25.

5. Of Reinforced Concrete

Oil Storage Reservoir Construction.* Pecos H. Calahan. Eng. & Contr. Oct. 21, '25.

Concrete Pit Structure Subjected to Diverse Stresses.* A. E. Wynn. Eng. N. R. Nov. 5, '25.

Lange Druckrohrleitungen aus Eisenbeton.* (Long Pressure Mains of Reinforced Concrete.)

R. Saliger. Schw. Bauz. Oct. 3, '25.

k. Tunnels and Tunnel Shield

- Vehicle Tunnel Under Hudson River Paved with Granite.* Eng. N. R. Oct. 29, '25.
 The Moffat Tunnel in Colorado.* Min. & Metal. Nov., '25.
 Grouting Reinforces Rock at Oak Grove Surge Chamber.* Eng. N. R. Nov. 5, '25.

D. Highways**a. Location**

- Factors Affecting the Location of a Highway. B. H. Piepmeyer. Mun. & Co. Eng. Oct., '25.

c. Construction

- Notes on Modern Practice in Road-Making.* Walton John Hadfield. Inst. C. E. Vol. 219, Pt. 1, 1924-'25.
 Design of Bituminous Macadam Pavements. John S. Crandell. (Paper read before Assoc. of Highway Officials, North Atlantic States.) Can. Engr. Oct. 20, '25.
 Thousand-Mile Road System Plan for Cook County.* Eng. N. R. Oct. 29, '25.
 The Hexagonal Slab Design of Concrete Pavement.* Lewis A. Ferry. Am. Soc. C. E. Nov., '25.
 Modern Road Construction. William Bell. Inst. Mun. & Co. Engrs. Nov. 3, '25.
 Readjustment of Grades on Steep Hills.* Eng. & Contr. Nov. 4, '25.
 Concrete Road Construction.* H. Eltinge Breed. (From paper read before Can. Good Roads Assoc.) Eng. & Contr. Nov. 4, '25.
 Present Status of Subgrade Studies. (From Public Roads.) Eng. & Contr. Nov. 4, '25.
 Efficiency in Construction Operations. T. J. Wasser. (Paper read before Assoc. of Highway Officials.) Eng. & Contr. Nov. 4, '25.
 Pavement Reinforcement Design. (From Public Works.) Can. Engr. Nov. 10, '25.
 Pavements Salvaged by Widening and Resurfacing.* Eng. N. R. Nov. 19, '25.
 Walzasphaltstrassen.* (Sheet-Asphalt Streets.) Geog. Klose. Gesund. Ing. Oct. 10, '25.
 Einiges vom neuzeltlichen Strassenbau. (On Modern Road Building.) Wernecke. Gesund. Ing. Oct. 10, '25.
 Die Bedeutung bituminöser Pflasterüberzüge für Ortsstrassen.* (The Importance of Bituminous Pavement Coatings for Local Streets.) Becker. Gesund. Ing. Oct. 10, '25.

d. Maintenance

- Gravel Road Maintenance in Wisconsin. J. T. Donaghey. (Paper read before Road School, Purdue Univ.) Can. Engr. Oct. 27, '25.
 Highway Maintenance in Manitoba. A. W. McGillivray. (From paper read before Can. Good Roads Assoc.) Eng. & Contr. Nov. 4, '25.
 Maintenance of Gravel Roads. M. H. Necker. (From paper read before Can. Good Roads Assoc.) Eng. & Contr. Nov. 4, '25.

e. Street Cleaning, Dust Prevention, Snow Removal

- Snow Drift Prevention and Control on Highways.* V. R. Burton. Eng. N. R. Nov. 5, '25.
 Massnahmen zur Erhaltung der Gesundheit der Strassenwärter.* (Precautions for Maintaining the Health of Street Cleaners.) Heinr. Calssinne. Gesund. Ing. Oct. 10, '25.
 Strassenreinigung.* (Street Cleaning.) Welzel. Gesund. Ing. Oct. 10, '25.

h. Vehicles, Automobiles, Traffic

- Traffic Control by Mechanical Devices.* Arthur H. Blanchard. Eng. & Contr. Nov. 4, '25.
 Strassenhygiene und Automobilverkehr.* (Street Hygiene and Automobile Traffic.) Geog. Wolff. Gesund. Ing. Oct. 10, '25.

x. Miscellaneous

- Principal Findings and Conclusions in Highway Subgrade Studies to Date. A. C. Rose. (From Public Roads.) Mun. & Co. Eng. Oct., '25.

E. Bridges, Viaducts, and Arches**a. Timber Bridges and Viaducts**

- Crescoted Timber Highway Bridge.* (From Wood Preserving News.) Eng. N. R. Nov. 4, '25.

b. Iron or Steel Bridges and Viaducts

- Steel Bridge Weights.* W. H. Thorpe. Eng. Oct. 30, '25.

d. Concrete and Reinforced Concrete Bridges and Viaducts

- Continuous-Girder Bridges of Concrete.* J. F. Sellar. Eng. N. R. Oct. 29, '25.
 Concrete Arch Bridge of Unusual Form and Details.* W. H. Rabe. Eng. N. R. Nov. 5, '25.

g. Swing, Bascule, Lift, Floating, Oscillating Bridges, Traveling Cranes

- Double-Leaf Bascule Bridge Over Canal at Seattle.* Eng. N. R. Nov. 19, '25.
 Le Développement des Ponts Mobiles et le Pont-Route Basculant de Petit-Willebroeck sur le Canal Maritime de Bruxelles au Rupel. (The Development of Movable Bridges and the Petit-Willebroeck Bascule Highway Bridge Over the Brussels Ship Canal at Rupel.) Eug. François. Ann. T. P. Belg. Pt. 4, '25.

h. Computations, Tests, etc.

- Structural Design of Bridges in Grant Park.* C. R. Hoyt. West. Soc. Engrs. Oct., '25.

x. Miscellaneous

Some Notes on Military Bridgework. J. A. L. Waddell. Mil. Engr. Nov.-Dec., '25.
 Bridge-Building of the Sixth Engineers.* Chandler Davis and Gilmore D. Clarke. Mil. Engr. Nov.-Dec., '25.

F. Inland Waters

c. Regulation of Waterways, Volumes of Discharge, etc.

The St. Lawrence Waterway to the Sea. Discussion: Gardner S. Williams, E. P. Goodrich, David B. Rushmore, Maurice W. Williams, L. H. Hart, A. Lindblad, and Walter M. Smith. Am. Soc. C. E. Nov., '25.

d. Diverting Dams

La Démolition du Barrage et de l'Ecluse de la Monnaie, à Paris.* (Demolition of the Monnaie Dam and Lock at Paris.) H. Lang. Gen. Civ. Oct. 24, '25.
 Wehrbauten an geschlebeführenden Flüssen.* (Weirs on Detritus Carrying Rivers.) Schw. Bauz. Serial beginning Oct. 10, '25.

k. Utilization of Inland Waterways, Freight, Capacity

Relation of the Ohio River and Its Tributaries to Transportation in the United States.* Discussion: R. N. Begien, L. D. Cornish, Charles S. Churchill, Charles Wuest, Jr., C. E. Grunsky, Charles A. Wilson and Hunter McDonald. Am. Soc. C. E. Nov., '25.

G. Maritime Works

b. Management and Protection of Coasts, Beaches, Dunes

Seawall Retains Picturesque California Highway.* Harlan D. Miller. Eng. N. R. Oct. 29, '25.

c. Vessels and Maritime Navigation, Lighthouses, Buoys, etc.

The Peninsular and Oriental Liner "Rawalpindi."* Eng. Serial beginning Oct. 16, '25.
 Relay Pump Barge on the Panama Canal.* John G. Claybourne. Mil. Engr. Nov.-Dec., '25.
 Le Nouveau Paquebot "D'Artagnan" de la Compagnie des Messageries Maritimes.* (The New Packet "D'Artagnan" of the Compagnie des Messageries Maritimes.) Oliver Queant. Gen. Civ. Oct. 10, '25.
 Doppelschrauben-Motorschiff "Weissenfels".* (The Twin Screw Motorship "Weissenfels"). Fr. Hillebrand and E. Müller. Ver. deu. Ing. Serial beginning Oct. 24, '25.

f. Maritime Rivers and Canals—Bank Protection

A Sea Level Canal Between the Delaware and Chesapeake.* Eng. N. R. Oct. 29, '25.

h. Wharves, Mooring Buoys, Harbor Equipment

Ships Unloaded by Barges Operating on Slipway Structure.* Eng. N. R. Oct. 29, '25.

j. Dockyard Machinery and Shipyards, Dry Docks

The Southampton Floating Dock.* Ernest Hinkly Salmon. Inst. C. E. Vol. 219, 1924-'25.
 Southampton Floating Dock: Subsidiary Works.* Francis Ernest Wentworth-Shields. Inst. C. E. Vol. 219, Pt. 1, 1924-'25.

H. Railroads. Street and Interurban Railways. Automobiles. Aeronautics

a. Railroads

1. General Articles

The Hudson River Connecting Railroad. W. F. Jordan. West. Soc. Engrs. Oct., '25.
 Building a Railroad Under Unusual Conditions.* Ben. B. Shaw. Ry. Age Oct. 31, '25.
 Some Notes on Railway Maintenance.* William H. Sellow. Mil. Engr. Nov.-Dec., '25.
 Compte Rendu Sommaire des Séances de la 10e Session de Congrès International des Chemins de Fer. (Londres 1925). (Summary Report of the Meetings of the 10th Session of the International Railroad Conference (London, 1925).) Rev. Gen. Oct., '25.

3. Roadbed. Construction Work

Southern Pacific Builds Important Line in Oregon.* Ry. Age Nov. 14, '25.

4. Track

Methods and Cost of Weeding Track. (Paper read before Roadmasters and Main. of Way Assoc.) Eng. & Contr. Oct. 21, '25.

Frisco Studies Various Methods of Making Tie Renewals.* J. M. Sills. Ry. Eng. & Main. Nov., '25.

Are Rail Failures Confined to American Roads? Ry. Eng. & Main. Nov., '25.

How the Life of Rails may be Increased. (From report read before Roadmasters & Main. of Way Assoc.) Ry. Rev. Nov. 14, '25.

6. Rolling Stock (Locomotives, Cars) Fuel

Simple Articulated Locomotives for G. N. Ry.* W. W. Baxter. Ry. Rev. Oct. 24, '25.

Report on Electrically Operated Pumping Plants. (Am. Ry. Bridge & Bldg. Assoc.) Ry. Eng. & Main. Nov., '25.

The Locomotive Testing Plant and Its Influence on Steam-Locomotive Design.* Lawford H. Fry. Mech. Eng. Nov., '25.

The Treatment of Water for Locomotive Use. R. C. Bardwell. (Paper read before Am. Ry. Bridge & Bldg. Assoc.) Ry. Eng. & Main. Nov., '25.

- New C. N. R. Oil-Electric Passenger Cars.* *Can. Engr.* Nov. 10, '25.
 P. R. R. Limited Cut-Off Switch Engines.* *W. W. Baxter. Ry. Rev.* Nov. 14, '25.
 Voiture Métallique Mixte de 1re et 2e Classes pour Grandes Lignes, Etudiée par l'Office Central d'Etudes de Matériel de Chemins de Fer.* (Mixed 1st and 2nd Class Steel Cars for Main Lines. Investigated by the Office Central d'Etudes de Matériel de Chemins de Fer.) *J. Vallancien. Rev. Gen.* Oct., '25.
 Betriebs- und Versuchungsergebnisse der russischen dieselelektrischen Lokomotive.* (Operating and Experimental Results of the Russian Diesel-Electric Locomotive.) *F. Meineke. Ver. deu. Ing.* Oct. 17, '25.
 Benzin-Triebwagen für gemischten Adhäsions- und Zahnradbetrieb.* (Benzine Locomotive for Mixed Adhesion and Cog Wheel Operation.) *H. Jenny. Schw. Bauz.* Oct. 17, '25.
 7. Use of Electricity
 Great Northern Electrification.* *E. Marshall. Ry. Age* Nov. 14, '25.
 Der elektrische Probebetrieb der Königl. Ungarischen Staatsbahnen.* (The Electrical Trial Operation of the Royal Hungarian State Railroads.) *L. von Verebely. Ver. deu. Ing.* Oct. 3, '25.
 Analytische Bestimmung des Schwankungsverhältnisses im Kraftbedarf elektrischer Bahnen und ähnlicher Zentralanlagen.* (Analytical Determination of the Fluctuation Ratio in the Power Requirement of Electrical Railways and Similar Central Plants.) *W. Kummer. Schw. Bauz.* Oct. 3, '25.
 8. Stations, Terminals, Engine Houses, Shops
 Pennsylvania Builds Large Car Dumper in Record Time.* *Ry. Age* Nov. 7, '25.
 f. Aeronautics
 Flugmotoren auf der neunten Pariser Luftfahrtausstellung.* (Aviation Engines at the Ninth Paris Aviation Exposition.) *F. Gossiau. Ver. deu. Ing.* Oct. 17, '25.

I. Municipal Water-Works. Agricultural Engineering. Irrigation

a. General Articles

- Water-Supplies to the Smaller Provincial Towns of Egypt.* *Reginald Humphrey Lee Pennell. Inst. C. E.* Vol. 219, Pt. 1, 1924-'25.
 Water Supply Development in Small Cities. *C. M. Ladd. Am. Soc. C. E.* Oct., '25.
 Municipal Water Supply Problems of Atlanta, Georgia. Discussion: *J. N. Chester and Nisbet Wingfield. Am. Soc. C. E.* Nov., '25.

b. Hydrology, Water Resources

- Principles of Refuse Incinerator Design and Operation. (From Comm. Report San. Eng. Sec. Am. Public Health Assoc.) *Eng. N. R.* Nov. 5, '25.

c. Dams and Reservoirs

- Construction of Intake at Goderich, Ont.* *E. H. Darling. Can. Engr.* Oct. 20, '25.
 Storage Dams at Lake Kenogami, Que.* *A. F. Dyer. Can. Engr.* Oct. 27, '25.
 Large Multiple-Arch Dam Being Built in Italy.* *J. B. Lippincott. Eng. N. R.* Oct. 29, '25.
 8-Million Gallon Covered Service Reservoir at Bushey Heath.* *Eng. Oct.* 30, '25.

d. Analysis and Purification of Water

- Reconstruction of Filters at Louisville. *W. H. Lovejoy. Am. W. W. Assoc.* Oct., '25.
 Characteristic Water Supply Struggles in West Virginia Cities.* *E. S. Tisdale. Am. W. W. Assoc.* Oct., '25.
 Report of Committee No. 1, on Standard Methods of Water Analysis. *Am. W. W. Assoc.* Oct., '25.
 Iodin Treatment in Michigan.* *E. D. Rich. Am. W. W. Assoc.* Oct., '25.
 Bacteriological Examination of Water. *C. T. Butterfield.* (Paper read before Ohio Conference on Water Purification.) *Can. Engr.* Oct. 27, '25.
 The Rate of Atmospheric Reaeration of Sewage Polluted Streams.* *H. W. Streeter. Am. Soc. C. E.* Nov., '25.
 The Rate of Deoxygenation of Polluted Waters.* *Emery J. Theriault. Am. Soc. C. E.* Nov., '25.
 Quantitative Studies of Bacterial Pollution and Natural Purification in the Ohio and the Illinois Rivers.* *J. K. Hoskins. Am. Soc. C. E.* Nov., '25.
 A Review of the Work of the United States Public Health in Investigations of Stream Pollution. *W. H. Frost. Am. Soc. C. E.* Nov., '25.
 A Little Known Fluid Principle and Its Practical Application.* *Eng. N. R.* Nov. 11, '25.
 The Use of Zeolites to Soften Water by Filtration.* *H. W. Terry. Power* Nov. 17, '25.
 Ueber die Veränderung des Rheinwassers durch die Düsseldorf Abwässer. (On the Alteration of the Rhine Water by the Düsseldorf Sewage.) *W. Bachmann and L. Fleischer. Gesund. Ing.* Oct. 24, '25.

e. Distribution of Water

- Present Status of Hetch Hetchy Water Supply and Power Project. *N. A. Eckert.* (Paper read before League of Calif. Municipalities.) *Mun. & Co. Eng.* Oct., '25.
 Experiences with Small Service Pipes. *J. E. Gibson. Am. W. W. Assoc.* Oct., '25.
 Pressure Pipe-line Arch Over the Durance.* *Eng. Nov.* 6, '25.

f. Drainage of Land

- Imperial Valley Drainage Problems—Progress in Solution.* *D. W. Murphy. Eng. N. R.* Nov. 12, '25.
 Die Arbeiten zur Entwässerung des Stadtgebietes von Batavia im letzten Jahrzehnt.* (The Work of Draining the Municipal Region of Batavia During the Last Ten Years.) *Karl Daub. Zeit. Bau.* Pt. 7, '25 (Ingenieurbauteil).

x. Miscellaneous

Beautifying Water Works Properties.* C. S. Denman. Am. W. W. Assoc. Oct., '25.

J. Sewerage, Sewage and Refuse Disposal

b. Sewage Disposal, Purification

- The Problem of Industrial Waste Disposal. C. M. Baker. Cornell C. E. Oct., '25.
 Basic Principles in Refuse Incinerator Practice. (From progress report of Comm. on Refuse Collection & Disposal, Am. Public Health Assoc.) Mun. & Co. Eng. Oct., '25.
 A British View of the Activated Sludge Process. F. W. Harris. (Paper read before Royal San. Assoc.) Mun. & Co. Eng. Oct., '25.
 The Tri-Cities' Activated-Sludge Plant at Alhambra, Calif. Eng. N. R. Oct. 29, '25.
 The Function of the Return Sludge Lift in the Activated Sludge Process of Sewage Disposal. F. C. Temple. Inst. Mun. & Co. Engrs. Nov. 3, '25.
 Utilization of Sewage Sludge Report to Two Societies. (Read before San. Section, Am. Public Health Assoc. by Langdon Pearse and Am. Soc. Mun. Impvts. by Samuel Greeley.) Eng. N. R. Nov. 19, '25.

K. Heat Engines

a. Steam Engines, Boilers

Zur Höchstdruck-Dampf-Entwicklung.* (On the Development of Highest Pressure Steam.) Schw. Bauz. Oct. 3, '25.

c. Gas and Oil Engines

- Kompressorlose Oelmaschinen.* (Compressorless Oil Engines.) E. Kux. Ver. deu. Ing. Oct. 10, '25.
 Abnahmeprüfung eines kompressorlosen M A N-Dieselmotors.* (Delivery Test of a Compressorless M A N Diesel Engine.) W. Laudahn. Ver. deu. Ing. Oct. 3, '25.
 Der kompressorlose Betrieb von Dieselmotoren.* (Compressorless Operation of Diesel Engines.) Franz Schultz. Ver. deu. Ing. Oct. 10, '25.

L. Electricity

b. Distribution and Transmission of Electricity

1. Power Plants

Latest Design and Practice in Power Plants.* A. I. E. E. Nov., '25.
 Das neuzeitliche Elektrizitätswerk.* (The Modern Electricity Works.) G. Klingenberg. Ver. deu. Ing. Oct. 10, '25.

2. Long-Distance Transmission of Energy

Distribution Line Practice of the San Joaquin Light and Power Corporation.* L. J. Moore and H. H. Minor. A. I. E. E. Nov., '25.
 Distribution Practices in Southern California.* R. E. Cunningham. A. I. E. E. Nov., '25.
 The 6-Cycle Distribution System of the Commonwealth Edison Company.* W. G. Kelley. A. I. E. E. Nov., '25.

Electric Power During the World War.* Charles Keller. Mil. Engr. Nov.-Dec., '25.

3. Distribution and Wiring of Electricity

Tables for the Calculation of Short Transmission Lines.* Eng. Inst. Can. Nov., '25.

d. Mechanical Uses of Electricity

2. Servomotors, Hoists, Elevators, Handling Machinery

The Design and Construction of Electric Cranes.* Daniel Adamson. (From paper read before Manchester Assoc. Engrs.) Engr. Oct. 30, '25.

e. Electro-Chemistry and Electrometallurgy

L'Industrie Electrothermique des Fontes, Fers, Aciers et des Ferro-alliages. (The Pig-Iron, Iron, Steel and Ferro-Alloy Electrothermic Industry.) Gen. Civ. Oct. 3, '25.

f. Signals and Communication

- Transmission of Pictures Over Wires.* T. T. Cook. Mil. Engr. Nov.-Dec., '25.
 Ein neues bildtelegraphisches Verfahren.* (A New Process for Telegraphing Pictures.) Berthold Freund. Ver. deu. Ing. Oct. 3, '25.
 Aufgabenstellung für Fernsprechanlagen mit Wählerbetrieb.* (The Problem of Telephone Installations with Selector Operation (Automatic).) F. Lubberger. Ver. deu. Ing. Oct. 17, '25.

M. Architecture

a. Educational, Government, and Scientific Buildings

La Cité Universitaire de Paris. La Fondation Deutsch de la Meurthe.* (The Paris University City. The Deutsch de la Meurth Foundation.) A. Bidault des Chaumes. Gen. Civ. Oct. 3, '25.

O. Administration. Legislation. Economics. Statistics

Modern Appraisal or Valuation. H. C. Baker, Jr. Can. Engr. Nov. 3, '25.

d. Administrative and Financial Management of Means of Communication**2. Routes and Roads**

Economics of Transportation. R. A. C. Henry. Can. Engr. Oct. 20, '25.

Q. Surveying and Geodesy

Stereo-Photo-Grammetric Surveying.* Bernard J. Woodruff. Engr. Serial beginning Oct. 30, '25.

Brock Development of Aerial Mapping.* Norman H. Brock. Mil Engr. Nov.-Dec., '25.
Sur une Nouvelle Méthode Française de Stéréotopométrie.* (On a New French Method of Stereotopometry.) Predhumeau. Ann. P. et C. Pt. 4, '25.

R. Landscape Engineering

Beautifying Water Works Properties.* C. S. Denman. Am. W. W. Assoc. Oct., '25.

S. City Planning

Excess Condemnation in City Planning. Discussion: Horace H. Sears, Frank O. Whitney, Andrew Wright Crawford, and Harold M. Lewis. Am. Soc. C. E. Nov., '25.
Transportation Planning and Metropolitan Development.* J. Rowland Bibbins. (From Annals, Am. Academy of Political & Social Science.) Eng. & Contr. Nov. 4, '25.

L. Electricity**b. Distribution and Transmission of Electricity**

1. Power Plants
Latest Design and Practice in Power Plants. A. I. E. Nov. '25.
The Economics of Electric Power. (The Modern Electric Works) G. H. H. Nov. '25.
2. Long-Distance Transmission of Energy
Distribution of the Electric Light and Power Companies. A. I. E. Nov. '25.
3. Distribution and Transmission of Electricity
The Electric Power System of the World. W. H. H. Nov. '25.
4. Distribution and Transmission of Electricity
Tables for the Calculation of Short Transmission Lines. Eng. Nov. '25.

a. Mechanical Use of Electricity

1. Servomotors, Motors, Elevators, Hoisting Machinery
The Design and Construction of Electric Cranes. G. H. H. Nov. '25.

c. Electro-Chemistry and Electro-Metallurgy

1. Industrial Electrochemistry
The Electrolytic Production of Potassium. G. H. H. Nov. '25.

f. Signals and Communication

Transmission of Pictures Over Wires. A. T. Cook. Mil Engr. Nov.-Dec., '25.
The Problem of Telephone
Aufgabenstellung für Fernsprechanlagen mit Wählvermittlung. (The Problem of Telephone Installations with Selector Operation.) F. H. H. Nov. '25.

M. Architecture

1. Educational, Government, and Scientific Buildings
La Cité Universitaire de Paris. (The University of Paris.) A. H. H. Nov. '25.

Employment Service

The Engineering Societies Employment Service is under the joint management of the National Societies of Civil, Mining, Mechanical, and Electrical Engineers, in co-operation with the Western Society of Engineers. The Service is available only to the several memberships and is maintained by contributions from the Societies and their individual members who are directly benefited.

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Men Available.—Under this heading, brief announcements will be published without charge. These announcements will not be repeated, except on request received after an interval of one month. Names and records will remain in the active files of the Bureau for a period of three months, and are renewable on request. Notices for *Proceedings* should be addressed to Employment Service, 33 West 39th Street, New York, N. Y., and should be received prior to the first of the month.

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Voluntary Contributions.—Members obtaining positions through the medium of this Service are invited to co-operate with the Societies in the financing of the work by nominal contributions made within thirty days after placement, on the basis of \$10 for all positions paying a salary of \$2 000 or less per annum; \$10 plus 1% of all amounts in excess of \$2 000 per annum; temporary positions (of one month or less), 3% of total salary received. The income contributed by the members, together with the finances appropriated by the four Societies named, will be sufficient, it is hoped, not only to maintain but to increase and extend the service.

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ENGINEER EXECUTIVE, M. Am. Soc. C. E.; age 35; married. Wide experience in operation, design, and construction of important water and sewage works. Successfully managed water-works serving 100 000 population, recently supervised design and construction of two 35 000 000-gal., steam-driven pumping stations, and 20 000 000-gal. softening plant. Former chief of important State department. Available on reasonable notice. C-589.

CIVIL ENGINEER, M. Am. Soc. C. E.; age 37; graduate civil engineer. Sixteen years' continuous engineering experience, two years, water supply; six years in public utility service, including design and construction, hydro-electric stations, sub-stations, transmission lines, and steam plants; two years in hospital construction; four years, water-front improvements, dredging, concrete wharves, and oil storage tank construction; three years, tropical construction experience. Available on reasonable notice. C-623.

Opportunities—A Bulletin of engineering positions available is published weekly and is available to members of the Society concerned at a subscription rate of \$3 per quarter, or \$10 per annum, payable in advance. Positions which are not filled promptly as a result of publication in the Bulletin may be announced herein.

Temporary Contributions—Members obtaining positions through the medium of this Service are invited to co-operate with the Society in the financing of the work by nominal contributions made within thirty days after placement, on the basis of \$10 for all positions paying a salary of \$2 000 or less per annum; \$10 plus 1% of all amounts in excess of \$2 000 per annum; temporary positions (of one month or less), 3% of total salary received. The income contributed by the members, together with the balance appropriated by the four Societies named, will be sufficient, it is hoped, not only to maintain but to increase and extend the service.

Replies to Announcements— Replies to announcements published herein, or in the Bulletin, should be addressed to the key number indicated in each case, with a two-cent stamp attached for re-forwarding, and forwarded to the Employment Service at the address given. Replies received by the Bureau after the positions in which they refer have been filled, will not be forwarded.

MEMBERS AVAILABLE

status in the design and construction of industrial buildings, roads and bridges, power plants, gas, electric, steam, and water plants, including estimating, reports and valuations. (See also B-9376) Available in two to four weeks. Location, Eastern United States. B-1188.

GRADUATE C. E., M. Am. Soc. C. E.; married; age 37. Fifteen years' experience in hydro-electric, irrigation, drainage, railroads, rivers and harbors. Excellent executive and construction man. Present

status in the design and construction of industrial buildings, roads and bridges, power plants, gas, electric, steam, and water plants, including estimating, reports and valuations. (See also B-9376) Available in two to four weeks. Location, Eastern United States. B-1188.

CIVIL ENGINEER, Assoc. M. Am. Soc. C. E.; age 38; married. Thirteen years' expe-

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Membership

(From November 4 to December 2, 1925)

Additions

Date of
Membership.

HONORARY MEMBERS			
PARSONS, William Barclay. Cons. Engr., 84 Pine St., New York N. Y.	Cons. Engr., 84 Pine St., New York N. Y.	Jun. 7, 1882 M. 2, 1887 Hon. M. Nov. 16, 1925	
TALBOT, Arthur Newell. (Past-President.) Prof. of Municipal and San. Eng. and in Chg. of Theoretical and Applied Mechanics, Univ. of Illinois, Urbana, Ill.	Prof. of Municipal and San. Eng. and in Chg. of Theoretical and Applied Mechanics, Univ. of Illinois, Urbana, Ill.	M. April 4, 1888 Hon. M. Nov. 16, 1925	
MEMBERS			
BALINA, Manuel Roque. Rivadavia 144, Temperley, Buenos Aires, Argentine Republic.	Rivadavia 144, Temperley, Buenos Aires, Argentine Republic.	Assoc. M. June 1, 1925	
BEALL, Pendleton. Asst. Chf. Engr., The Texas Co., Box 1266, Port Arthur, Tex.	Asst. Chf. Engr., The Texas Co., Box 1266, Port Arthur, Tex.	Jun. 6, 1911 Assoc. M. Mar. 14, 1916 M. Oct. 12, 1925	
BIRD, Byron. Prof., Structural Eng., Texas Agricultural and Mech. Coll., Faculty Exchange, Box 147, College Station, Tex.	Prof., Structural Eng., Texas Agricultural and Mech. Coll., Faculty Exchange, Box 147, College Station, Tex.	Assoc. M. Nov. 26, 1918 M. Oct. 12, 1925	
BULLEN, Carroll Ailing. 260 Jessup St., Portland, Ore.	260 Jessup St., Portland, Ore.	Jun. Oct. 12, 1925	
BURCHARD, Edwin Day. Care, U. S. Geological Survey, 316 Jackson Bldg., Asheville, N. C.	Care, U. S. Geological Survey, 316 Jackson Bldg., Asheville, N. C.	Assoc. M. July 6, 1925	
CARTER, Clarence Elmore. Asst. Engr., Metcalf & Eddy, 14 Beacon St., Room 407, Boston, Mass.	Asst. Engr., Metcalf & Eddy, 14 Beacon St., Room 407, Boston, Mass.	Assoc. M. Oct. 3, 1911 M. Oct. 12, 1925	
CHAMBERLAIN, Harold Nash. Teacher, Applied Math. and Drafting, Civ. Eng. Dept., Utica Free Academy, Utica, N. Y.	Teacher, Applied Math. and Drafting, Civ. Eng. Dept., Utica Free Academy, Utica, N. Y.	Assoc. M. Jan. 19, 1925	
DOBBS, Abraham Harry. Checker, Geo. A. Fuller Co., 949 Broadway (Res., 611 West 113th St., Apartment 23), New York, N. Y.	Checker, Geo. A. Fuller Co., 949 Broadway (Res., 611 West 113th St., Apartment 23), New York, N. Y.	Jun. Oct. 12, 1925	
GREEN, Nathaniel Warren. Structural Engr., 19 Petteway Bldg., Tampa, Fla.	Structural Engr., 19 Petteway Bldg., Tampa, Fla.	Jun. Dec. 5, 1911 Assoc. M. Sept. 10, 1918 M. Oct. 12, 1925	
GUNN, John Patterson. 653 West Hancock St., Detroit, Mich.	653 West Hancock St., Detroit, Mich.	Jun. Oct. 12, 1925	
HANDLEY, Harvey Lockhart. County Engr., Greenbrier County, Lewisburg, W. Va.	County Engr., Greenbrier County, Lewisburg, W. Va.	Assoc. M. July 2, 1913 M. Oct. 12, 1925	
HENRY, Charles Lewis. Engr., Lee C. Moore & Co., 624 Oliver Bldg., Pittsburgh, Pa.	Engr., Lee C. Moore & Co., 624 Oliver Bldg., Pittsburgh, Pa.	Jun. Aug. 31, 1925	
HOLWAY, William Rea. Cons. Engr., 503 Wright Bldg., Tulsa, Okla.	Cons. Engr., 503 Wright Bldg., Tulsa, Okla.	Assoc. M. April 19, 1920 M. Oct. 12, 1925	
HUMPHREYS, Charles Wesley. Box 13, Roanoke, Va.	Box 13, Roanoke, Va.	Jun. June 1, 1925	
JERAULD, Henry Franklin. 1515 Thirteenth St., Sacramento, Calif.	1515 Thirteenth St., Sacramento, Calif.	Jun. Oct. 12, 1925	
KING, Clayton Landis. City Res. Engr., City Hall, Fort Myers, Fla.	City Res. Engr., City Hall, Fort Myers, Fla.	Assoc. M. Oct. 12, 1925	
LAVERTY, Finley Burnap. Transitman, Southern California Edison Co., Camp 73, Big Creek, Calif.	Transitman, Southern California Edison Co., Camp 73, Big Creek, Calif.	Jun. Oct. 12, 1925	
LUTGE, Henry Vincent. 426 Twenty-third Ave., San Francisco, Calif.	426 Twenty-third Ave., San Francisco, Calif.	Assoc. M. July 6, 1925	
MALKWITZ, Herbert Paul. 453 Fourteenth St., Brooklyn, N. Y.	453 Fourteenth St., Brooklyn, N. Y.	Jun. June 1, 1925	
MANNING, James Henry. Eng. Mgr., Stone & Webster, Inc., 147 Milk St., Boston, Mass.	Eng. Mgr., Stone & Webster, Inc., 147 Milk St., Boston, Mass.	Assoc. M. Jan. 3, 1911 M. Oct. 12, 1925	
MOORE, Lacy. Engr. of Surveys, So. Ry. (Res., 1412 Massachusetts Ave., N. W., Apartment 51), Washington, D. C.	Engr. of Surveys, So. Ry. (Res., 1412 Massachusetts Ave., N. W., Apartment 51), Washington, D. C.	M. June 1, 1925	
MORSE, Chauncey Neville. 448 Park Rd., Ambridge, Pa.	448 Park Rd., Ambridge, Pa.	Jun. Oct. 12, 1925	
NEALE, John Arthur. Chf. Engr., The Chicago Board of Underwriters, 175 West Jackson St., Room 2158, Chicago, Ill.	Chf. Engr., The Chicago Board of Underwriters, 175 West Jackson St., Room 2158, Chicago, Ill.	Assoc. M. Oct. 12, 1925	
NEIBLING, Thomas Meintzer. Research Engr., State Highway Dept., East Point, Ga.	Research Engr., State Highway Dept., East Point, Ga.	Assoc. M. Oct. 12, 1925	
NIELSEN, Frederick Austin. 135 Hillside Ave., Piedmont, Calif.	135 Hillside Ave., Piedmont, Calif.	Assoc. M. Oct. 12, 1925	
O'ROURKE, James Francis. Cons. Engr., 7301 Fourth Ave., Brooklyn, N. Y.	Cons. Engr., 7301 Fourth Ave., Brooklyn, N. Y.	Assoc. M. Oct. 12, 1925	
PARKIN, William Augustus Koch. U. S. Asst. Engr., U. S. Engr. Office, 1006 McCall Bldg., Memphis, Tenn.	U. S. Asst. Engr., U. S. Engr. Office, 1006 McCall Bldg., Memphis, Tenn.	M. Oct. 12, 1925	
PAYNE, Harold B. 103 East 29th St., New York, N. Y.	103 East 29th St., New York, N. Y.	Assoc. M. June 1, 1925	
POLLOCK, Carl DeForrest. Office Engr., W. C. Morse, 422 Alaska Bldg. (Res., 1628 North 53d St.), Seattle, Wash.	Office Engr., W. C. Morse, 422 Alaska Bldg. (Res., 1628 North 53d St.), Seattle, Wash.	Assoc. M. Mar. 12, 1923 M. Oct. 12, 1925	

MEMBERSHIP—(Continued)		Date of Membership.	
RICHARDSON, George Sherwood. Care, Bureau of Bridges, Dept. of Public Works, 519 Smithfield St., Pittsburgh (Res., 171 Mound St., Fair Oaks), Pa.....	Assoc. M.	Oct. 12, 1925	
ROBERTS, John Gibbons. 115 Oak Cliff Boulevard, Dallas, Tex..	Assoc. M.	Aug. 31, 1925	
ROSENBERGER, Raymond Joyce. Woolsey, Asheville, N. C.....	Jun.	Oct. 12, 1925	
RUSSUM, Thomas French. Engr., Jarrett-Chambers Co., Inc., 30 East 42d St., New York (Res., 12 Seneca Ave., White Plains), N. Y.....	M.	Oct. 12, 1925	
SHERARD, Howard Macoun. Designing Engr., Queensland Irrig. and Water Supply Comm., Adelaide St., Brisbane, Queens-land, Australia.....	Jun.	Sept. 10, 1923	
SUTHERLAND, Ian MacKenzie. Draftsman and Asst. Engr., Melbourne and Met. Board of Works, 50 Denbigh Rd., Armadale, Victoria, Australia.....	Assoc. M.	Aug. 31, 1925	
TAYLOR, Ira Earl. Div. Engr., State Highway Comm., Box 449, Beloit, Kans.....	M.	Aug. 31, 1925	
THORNBURGH, Charles Garland. Chf. Engr., The Rust Eng. Co., 34 Terrace Rd., Rosslyn Farms, Carnegie, Pa.....	Assoc. M.	July 6, 1925	
TOTTI y TORRES, Etienne. Chf. Engr., Am. R. R. of Porto Rico, Box 634, San Juan, Porto Rico.....	M.	June 1, 1925	
WIGNALL, Walter Bennett. 37 Goodmayes Lane, Goodmayes, Ilford, England.....	Assoc. M.	Jan. 14, 1924	
WILLIAMS, Fred Thomas. 320 Oak Ave., Sanford, Fla.....	M.	Oct. 12, 1925	
YOUNG, Richard Wilfred. Asst. Constr. Engr., Eastern Bridge & Structural Co., 15 Schussler Rd., Worcester, Mass.....	Assoc. M.	June 1, 1925	
ZEHR, Vratislav Adolph. Cons. Engr., Brandys-Labe, Czecho-slovakia.....	Assoc. M.	June 16, 1919	
	M.	Oct. 12, 1925	

Deaths

BAKER, Ira Osborn. Elected Member, May 3, 1893; died November 8, 1925.	
BELDEN, Harry Austin. Elected Member, October 4, 1905; died October 30, 1925.	
GOODELL, John Stanton. Elected Associate Member, March 7, 1906; died November 13, 1925.	
HARRISON, Edlow Wingate. Elected Member, June 3, 1885; died November 27, 1925.	
HILL, Curtis. Elected Associate Member, October 2, 1901; Member, January 3, 1907; died October 18, 1925.	
HODGKINS, Henry Clarence. Elected Member, June 6, 1911; died November 8, 1925.	
JANNEY, William Dean. Elected Associate Member, May 6, 1891; Member, April 1, 1896; died October 30, 1925.	
LALLY, John Michael. Elected Affiliate, September 2, 1908; died October 8, 1925.	
MARANI, Virgil George. Elected Member, February 4, 1914; died November 2, 1925.	
SUBLETTE, George Washington. Elected Member, October 1, 1902; date of death unknown.	

Total Membership of the Society December 2, 1925

Members	5 024
Associate Members	5 242
Corporate Members	10 266
Honorary Members	15
Juniors	811
Affiliates	154
Fellows	8
Total	11 254